

1998

## An integrative and dynamic analysis of business bankruptcy in Australia

Lillian Cheung  
*University of Wollongong*

Follow this and additional works at: <https://ro.uow.edu.au/theses>

### University of Wollongong

#### Copyright Warning

You may print or download ONE copy of this document for the purpose of your own research or study. The University does not authorise you to copy, communicate or otherwise make available electronically to any other person any copyright material contained on this site.

You are reminded of the following: This work is copyright. Apart from any use permitted under the Copyright Act 1968, no part of this work may be reproduced by any process, nor may any other exclusive right be exercised, without the permission of the author. Copyright owners are entitled to take legal action against persons who infringe their copyright. A reproduction of material that is protected by copyright may be a copyright infringement. A court may impose penalties and award damages in relation to offences and infringements relating to copyright material.

Higher penalties may apply, and higher damages may be awarded, for offences and infringements involving the conversion of material into digital or electronic form.

Unless otherwise indicated, the views expressed in this thesis are those of the author and do not necessarily represent the views of the University of Wollongong.

### Recommended Citation

Cheung, Lillian, An integrative and dynamic analysis of business bankruptcy in Australia, Doctor of Philosophy thesis, Department of Economics, University of Wollongong, 1998. <https://ro.uow.edu.au/theses/1311>

## **NOTE**

This online version of the thesis may have different page formatting and pagination from the paper copy held in the University of Wollongong Library.

## **UNIVERSITY OF WOLLONGONG**

### **COPYRIGHT WARNING**

You may print or download ONE copy of this document for the purpose of your own research or study. The University does not authorise you to copy, communicate or otherwise make available electronically to any other person any copyright material contained on this site. You are reminded of the following:

Copyright owners are entitled to take legal action against persons who infringe their copyright. A reproduction of material that is protected by copyright may be a copyright infringement. A court may impose penalties and award damages in relation to offences and infringements relating to copyright material. Higher penalties may apply, and higher damages may be awarded, for offences and infringements involving the conversion of material into digital or electronic form.

**AN INTEGRATIVE AND DYNAMIC ANALYSIS OF BUSINESS  
BANKRUPTCY IN AUSTRALIA\***

**\*A thesis submitted in fulfilment of the requirements for the  
award of the degree**

**Doctor of Philosophy**

**from**

**UNIVERSITY OF WOLLONGONG**

**by**

**Lillian Cheung**

***Bachelor of Commerce (University of Wollongong)***

***Master of Commerce (University of Wollongong)***

**Department of Economics**

**1998**

# DECLARATION

I hereby certify that this thesis has not been submitted previously as part of the requirements of another degree and that it is the result of my own independent research.

Lillian Cheung

CONTENTS

DECLARATION..... ii

CONTENTS..... iii

FIGURES ..... v

TABLES..... vi

ACKNOWLEDGEMENTS..... viii

ABSTRACT ..... ix

CHAPTER 1 INTRODUCTION..... 1

1.1 THE CONCEPT OF BANKRUPTCY..... 4

1.1.1 Business Failure..... 4

1.1.2 Insolvency..... 5

1.1.3 Bankruptcy ..... 6

1.2 OBJECTIVES AND STRUCTURE OF THE THESIS ..... 8

CHAPTER 2 LITERATURE REVIEW..... 10

2.1 FINANCIAL RATIO ANALYSES ..... 10

2.2 MICROECONOMIC ASPECTS OF BUSINESS FAILURE..... 16

2.3 OTHER INDIRECTLY RELATED MICROECONOMIC STUDIES..... 17

2.4 EFFECTS OF MACROECONOMIC FACTORS ON BUSINESS FAILURES ..... 18

2.5 EFFECTS OF INTERINDUSTRY LINKAGES ON BUSINESS FAILURES ..... 24

CHAPTER 3 RATES OF BANKRUPTCY AND THEIR POTENTIAL EXPLANATORY FACTORS: AN OVERVIEW ..... 26

3.1 AN OVERVIEW OF THE RATES OF BANKRUPTCY IN AUSTRALIA’S INDUSTRIES ..... 26

3.2 INTER-INDUSTRY LINKAGES..... 29

3.3 AN OVERVIEW OF THE EXPLANATORY VARIABLES..... 31

3.4 TIME SERIES PROPERTIES OF THE VARIABLES..... 34

3.5 CONCLUDING REMARKS..... 38

CHAPTER 4 COINTEGRATION ANALYSIS..... 40

4.1 ENGLE-GRANGER TEST FOR COINTEGRATION..... 40

4.2 ESTIMATION RESULTS..... 42

CHAPTER 5 GRANGER CAUSALITY TEST..... 45

5.1 THE CONCEPT OF GRANGER’S CAUSALITY ..... 45

5.2 THE CAUSALITY TESTS FOR BANKRUPTCY RATES..... 46

5.3 THE CAUSALITY-TEST RESULTS .....	48
<b>CHAPTER 6 INTEGRATIVE AND DYNAMIC APPROACH TO BUSINESS FAILURE.....</b>	<b>51</b>
6.1 THE ECONOMETRIC FRAMEWORK .....	52
6.1 EXPLANATORY VARIABLES: DEFINITIONS AND HYPOTHESES .....	58
6.2.1 <i>Industry-Specific Conditions</i> .....	58
6.2.2 <i>Domestic Economic Conditions</i> .....	61
6.2.3 <i>International Economic Conditions</i> .....	65
<b>CHAPTER 7 THE INTEGRATIVE AND DYNAMIC SYSTEM'S ESTIMATION AND TEST RESULTS.....</b>	<b>69</b>
7.1 OVERALL FINDINGS .....	71
7.2 PRIMARY PRODUCTION INDUSTRY .....	75
7.3 MINING & QUARRYING INDUSTRY.....	78
7.4 MANUFACTURING INDUSTRY .....	81
7.5 CONSTRUCTION INDUSTRY.....	85
7.6 TRANSPORT, STORAGE & COMMUNICATION INDUSTRY .....	89
7.7 FINANCE AND PROPERTY INDUSTRY .....	91
<b>CHAPTER 8 SUMMARY AND CONCLUSION.....</b>	<b>95</b>
8.1 GOVERNMENT POLICY INSTRUMENTS AND IMPLICATIONS FOR BUSINESS STABILITY .....	96
8.2 INDUSTRY-SPECIFIC AND DOMESTIC ECONOMIC FACTORS AND BUSINESS STABILITY .....	99
8.3 INTERNATIONAL ECONOMIC FACTORS AND BUSINESS STABILITY .....	101
8.4 POSSIBLE EXTENSIONS.....	102
<b>APPENDIX.....</b>	<b>104</b>
<b>REFERENCES.....</b>	<b>155</b>
<b>AUTHOR INDEX.....</b>	<b>161</b>

# FIGURES

<b>FIGURE 3-1</b>	<b>BUSINESS BANKRUPTCY RATES IN AUSTRALIA BY INDUSTRY (1973-1992)</b>	<b>28</b>
<b>FIGURE A1</b>	<b>CONCENTRATION RATIO BY INDUSTRY</b>	<b>111</b>
<b>FIGURE A2</b>	<b>INDUSTRIAL DISPUTES BY INDUSTRY</b>	<b>113</b>
<b>FIGURE A3</b>	<b>HOUSING PRICES, 1973-92</b>	<b>115</b>
<b>FIGURE A4</b>	<b>ANNUAL AVERAGE REAL MANUFACTURING WAGE RATE, 1973-92</b>	<b>117</b>
<b>FIGURE A5</b>	<b>STATE GOVERNMENT SPENDING AT CONSTANT PRICES, 1975-92</b>	<b>119</b>
<b>FIGURE A6</b>	<b>COMMONWEALTH/FEDERAL GOVERNMENT SPENDING AT CONSTANT PRICES, 1975-92</b>	<b>121</b>
<b>FIGURE A7</b>	<b>PERSONAL INCOME TAX RATE, 1973-92</b>	<b>123</b>
<b>FIGURE A8</b>	<b>INTEREST RATE, 1973-92</b>	<b>125</b>
<b>FIGURE A9</b>	<b>REAL MONEY SUPPLY, 1973-92</b>	<b>127</b>
<b>FIGURE A10</b>	<b>STATE PER-CAPITA INCOME AT CONSTANT PRICES, 1978-92</b>	<b>129</b>
<b>FIGURE A11</b>	<b>EXCHANGE RATE, 1973-92</b>	<b>131</b>
<b>FIGURE A12</b>	<b>WORLD PRICES, 1973-92</b>	<b>133</b>
<b>FIGURE A13</b>	<b>JAPAN’S GROSS DOMESTIC PRODUCT AT CONSTANT PRICES, 1973-92</b>	<b>135</b>
<b>FIGURE A14</b>	<b>NEW ZEALAND’S GROSS DOMESTIC PRODUCT AT CONSTANT PRICES, 1973-92</b>	<b>137</b>

## TABLES

<b>TABLE 3-1</b>	THE RATES OF BANKRUPTCY IN SIX MAJOR INDUSTRIES IN AUSTRALIA (1973-1992)	27
<b>TABLE 3-2</b>	CORRELATION MATRIX OF BANKRUPTCY RATES BETWEEN INDUSTRIES	31
<b>TABLE 3-3</b>	ESTIMATION RESULTS OF THE UNIT ROOT TESTS	38
<b>TABLE 4-1</b>	ENGLE-GRANGER COINTEGRATION TEST WITHIN A MULTIVARIATE MODEL FOR BR <sub>1</sub> , BR <sub>2</sub> , BR <sub>3</sub> AND BR <sub>4</sub> WITH AND WITHOUT TREND	43
<b>TABLE 4-2</b>	ENGLE-GRANGER COINTEGRATION TEST OF PAIRS OF INDUSTRIES	44
<b>TABLE 5-1</b>	A SUMMARY OF THE ESTIMATED RESULTS OF THE GRANGER CAUSALITY TESTS	49
<b>TABLE 7-1</b>	A SUMMARY OF THE ESTIMATED ELASTICITIES BETWEEN DIFFERENCES OF DEPENDENT AND INDEPENDENT VARIABLES OBTAINED FROM 3SLS ESTIMATION	72
<b>TABLE A1</b>	CONCENTRATION RATIOS IN THE SIX MAJOR INDUSTRIES IN AUSTRALIA	110
<b>TABLE A2</b>	INDUSTRIAL DISPUTES IN SIX MAJOR INDUSTRIES IN AUSTRALIA	112
<b>TABLE A3</b>	HOUSING PRICES, 1973-92	114
<b>TABLE A4</b>	ANNUAL AVERAGE REAL MANUFACTURING WAGE RATE, 1973-92	116
<b>TABLE A5</b>	STATE GOVERNMENT SPENDING AT CONSTANT PRICES, 1975-92	118
<b>TABLE A6</b>	COMMONWEALTH/FEDERAL GOVERNMENT SPENDING AT CONSTANT PRICES, 1975-92	120
<b>TABLE A7</b>	PERSONAL INCOME TAX RATE, 1973-92	122
<b>TABLE A8</b>	INTEREST RATE, 1973-92	124
<b>TABLE A9</b>	REAL MONEY SUPPLY, 1973-92	126
<b>TABLE A10</b>	STATE PER-CAPITA INCOME AT CONSTANT PRICES, 1978-92	128
<b>TABLE A11</b>	EXCHANGE RATE, 1973-92	130
<b>TABLE A12</b>	WORLD PRICES, 1973-92	132



<b>TABLE A13</b> JAPAN'S GROSS DOMESTIC PRODUCT AT CONSTANT PRICES, 1973-92	134
<b>TABLE A14</b> NEW ZEALAND'S GROSS DOMESTIC PRODUCT AT CONSTANT PRICES, 1973-92	136
<b>TABLE A15</b> ESTIMATION RESULTS OF THE GRANGER CAUSALITY TEST (CRITERION: FPE)	138
<b>TABLE A16</b> ESTIMATION RESULTS OF THE GRANGER CAUSALITY TEST (CRITERION: SP)	142
<b>TABLE A17</b> CORRELATION MATRIX OF EXPLANATORY VARIABLES AT LEVELS	146
<b>TABLE A18</b> CORRELATION MATRIX OF EXPLANATORY VARIABLES IN FIRST DIFFERENCES	147
<b>TABLE A19</b> A SUMMARY OF 3SLS RESULTS WITH DIFFERENCES OF WEIGHTED POOLED-CROSS-SECTION TIME-SERIES OBSERVATIONS	148
<b>TABLE A20</b> A SUMMARY OF THE DIRECTIONS OF ASSOCIATIONS BETWEEN DEPENDENT AND INDEPENDENT VARIABLES AT LEVELS OBTAINED FROM 3SLS ESTIMATION	154

## ACKNOWLEDGEMENTS

I would like to express my deepest gratitude to my supervisor, Professor Amnon Levy for his guidance, invaluable suggestions, encouragement, as well as the extensive time on reading and evaluating the prose. I am also grateful to Dr. Khorshed Chowdhury and Dr. Tony Webber for their advice in conducting some of the statistical tests.

I am indebted to Michael Organ, Stuart Svensen and Mei Ball for their assistance in data collection, and Robert Hood for his advice on typesetting.

I am also indebted to Dr. Christopher Worswick and other participants of the PhD Conference in Economics and Business 1996 for their invaluable comments.

I also wish to thank Wolfgang Brodessor for his help on computer programme installation for running the statistical tests.

Sincere thanks also go to Professor Robert Castle and Professor Donald Lewis for giving me the opportunity to do my PhD studies.

Last but not least, I would like to thank my parents and husband for their love, support and patience while I am away.

## ABSTRACT

This thesis proposes an integrative and dynamic approach for assessing the effects of linkages across industries, industry-specific conditions, aggregate domestic economic conditions and international economic conditions on the rates of bankruptcy in six of Australia's major industries: primary production, mining and quarrying, manufacturing, building and construction, transport, storage and communication and finance and property. The effects of these factors are estimated within a dynamic and simultaneous-equation system with pooled cross-state time-series observations for the period 1978 to 1992. In addition, preliminary tests of cointegration and causality are conducted with nation-wide time-series data for the period 1973 to 1992 in order to explore the possible linkages among industries' bankruptcy rates.

The estimation results of the preliminary analyses and the dynamic and simultaneous equation system have both suggested inter-industry linkages among bankruptcy rates. Moreover, the estimation results of the simultaneous-equation system have lent support to the survival of the fittest hypothesis for all industries studied. A number of other economic variables have also been found to be significantly associated with business bankruptcy rates, which include industry-specific variables such as the number of industrial disputes, housing prices and manufacturing wage rate; domestic economic variables such as state per-capita income, federal government spending, personal income tax rate, interest rate and money supply; as well as international economic factors such as exchange rate, world prices and Japan's GDP. Among these variables, government policy instruments have been found to have relatively larger effects on the rates of bankruptcy. The estimation results of these analyses might help policy-makers design a comprehensive stabilisation policy for the Australian business sector.